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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,168	03/08/2001	Takashi Saida	44471-254519 (13700)	6188
23370	7590	11/17/2004	EXAMINER	
JOHN S. PRATT, ESQ KILPATRICK STOCKTON, LLP 1100 PEACHTREE STREET ATLANTA, GA 30309			KAO, CHIH CHENG G	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 11/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/802,168

Applicant(s)

SAIDA ET AL.

Examiner

Chih-Cheng Glen Kao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/16/04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stone et al. (US Patent 5982515) in view of Wickham et al. (US Patent 6708003).
2. Regarding claims 1 and 2, Stone et al. discloses an optical signal processing device (Fig. 15) comprising an input optical waveguide (Fig. 15, input optical carrier); an optical splitter configured to split optical signals entered at the input optical waveguide into plural sets (Fig. 15, #270, 272, and 274); an optical delay waveguide array formed by a plurality of optical delay waveguides with mutually different delay amounts which are configured to delay the optical signals split by the optical splitter (col. 14, lines 1-3); an optical combiner configured to combine the optical signals delayed by the optical delay waveguide array (Fig. 15, #280); an output optical waveguide connected to an output port of the optical combiner (Fig. 15, output optical combiner); and an optical gate configured to gate the optical signals outputted from the optical combiner or entered into the optical delay waveguide array (Fig. 15, #276 and 278); wherein the optical signal processing device is a purely optical device that operates entirely in an optical region (Fig. 15).

However, Stone et al. does not disclose an optical amplitude adjustment function for adjusting amplitudes of the optical signals.

Wickham et al. teaches an optical amplitude adjustment function for adjusting amplitudes of the optical signals (Fig. 1, #23).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the device of Stone et al. with the amplitude adjustment of Wickham et al., since one would be motivated to incorporate this to better control the optical signal for more efficient transmission to a destination point (Abstract) as implied from Wickham et al.

Note that the functional recitation of amplitude of an output signal of the optical gate representing a digital-to-analog converted value of the optical signals has not been given patentable weight because it is narrative in form.

3. Regarding claim 3, Stone et al. further discloses wherein the input optical waveguide, the optical splitter, the optical delay waveguide array, the optical combiner, the output optical waveguide, and the optical gate are provided on a substrate (Fig. 16), and the optical gate (Fig. 15, #276) is provided between the optical combiner (Fig. 15, #280) and the output optical waveguide (Fig. 15, output optical carrier).

4. Regarding claim 4, Stone et al. as modified above suggests a device as recited above. Stone et al. further discloses the input optical waveguide, the optical splitter, the optical delay waveguide array, the optical combiner, and the output optical waveguide provided on a substrate

(Fig. 16), and the optical gate (Fig. 15, #276) connected to the output optical waveguide (Fig. 15, output optical carrier).

However, Stone et al. does not disclose an optical gate outside a substrate.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the device of Stone et al. with the optical gate outside the substrate, since rearranging parts of an invention involves only routine skill in the art. One would be motivated to incorporate such a modification to make it easier to replace defective parts that are separable instead of being integrated into one piece.

5. Regarding claim 5, Stone et al. further discloses wherein the optical gate includes a plurality of optical gate elements (Fig. 15, #278 and 276) respectively provided on the optical delay waveguides of the optical delay waveguide array (Fig. 15).

6. Claims 1, 2, and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. (US Patent 5414548) in view of Wickham et al.

7. Regarding claims 1 and 2, Tachikawa et al. discloses an optical signal processing device (Fig. 9) comprising an input optical waveguide (Figs. 7 and 9, waveguide between #93 and 44); an optical splitter configured to split optical signals entered at the input optical waveguide into plural sets (Figs. 7 and 9, #44); an optical delay waveguide array formed by a plurality of optical delay waveguides with mutually different delay amounts which are configured to delay the optical signals split by the optical splitter (Fig. 9, #94); an optical combiner configured to

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combine the optical signals delayed by the optical delay waveguide array (Figs. 7 and 9, #45); an output optical waveguide connected to an output port of the optical combiner (Fig. 9, #7); and an optical gate configured to gate the optical signals outputted from the optical combiner or entered into the optical delay waveguide array (Fig. 9, #96); wherein the optical signal processing device is a purely optical device that operates entirely in an optical region (Fig. 9).

However, Tachikawa et al. does not disclose an optical amplitude adjustment function for adjusting amplitudes of the optical signals.

Wickham et al. teaches an optical amplitude adjustment function for adjusting amplitudes of the optical signals (Fig. 1, #23).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the device of Tachikawa et al. with the amplitude adjustment of Wickham et al., since one would be motivated to incorporate this to better control the optical signal for more efficient transmission to a destination point (Abstract) as implied from Wickham et al.

Note that the functional recitation of amplitude of an output signal of the optical gate representing a digital-to-analog converted value of the optical signals has not been given patentable weight because it is narrative in form.

8. Regarding claim 5, Tachikawa et al. further discloses wherein the optical gate includes a plurality of optical gate elements (Fig. 9, #96) respectively provided on the optical delay waveguides of the optical delay waveguide array (Fig. 9, #94).

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9. Regarding claims 6 and 7, Tachikawa et al. as modified above suggests a device as recited above.

However, Tachikawa et al. does not disclose phase controllers and amplitude adjustments respectively provided on the delay waveguides.

Wickham et al. teaches phase controllers (Fig. 1, #22) and amplitude adjustments (Fig. 1, #23) respectively provided on the delay waveguides (Fig. 1, #28).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further modify the device of Tachikawa et al. with the phase controllers and amplitude adjustments of Wickham et al., since one would be motivated to incorporate these to better control the optical signal for more efficient transmission to a destination point (Abstract) as implied from Wickham et al.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. in view of Wickham et al. as applied to claim 1 above, and further in view of Okuno et al. (JP 11-133364) and Ishida et al. (US Patent 5937117).

Tachikawa et al. as modified above suggests a device as recited above.

However, Tachikawa et al. does not disclose waveguides provided in forms of silica-based optical waveguides and a Mach-Zehnder switch having a thin film heater connected with another thin film heater as the amplitude controller.

Wickham et al. further teaches waveguides provided in forms of silica-based optical waveguides (col. 4, lines 11-13). Okuno et al. teaches a Mach-Zehnder switch having a heater

(Fig. 1, #10) connected with another heater (Fig. 1, #11) as the amplitude controller (Title).

Ishida et al. teaches thin film heaters in Mach-Zehnder switches (Fig. 22, #165).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the silica-based waveguides of Wickham et al., since one would be motivated to make such a modification to more easily place the components of the device on a compact surface substrate (Fig. 1, substrate under #12) as implied from Wickham et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the Mach-Zehnder switch as an amplitude controller of Okuno et al., since one would be motivated to make such a modification to provide a controller with higher reliability (Abstract, Problem to be Solved) as shown by Okuno et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the thin film heater of Ishida et al., since one would be motivated to make such a modification to make the device more compact (col. 1, line 56, "thin film") as implied from Ishida et al.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. in view of Wickham et al. as applied to claim 1 above, and further in view of Kito et al. (JP 09-258045).

Tachikawa et al. as modified above suggests a device as recited above.

However, Tachikawa et al. does not disclose a multi-mode interference optical coupler.

Kito et al. teaches a multi-mode interference optical coupler (Abstract, Solution).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the coupler of Kito et al., since one would be motivated to make such a modification for faster optical transmissions in optical communication systems (Abstract, Problem to be Solved) as implied from Kito et al.

12. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. in view of Wickham et al. as applied to claim 1 above, and further in view of Inoue et al. (US Patent 5546483).

Tachikawa et al. as modified above suggests a device as recited above.

However, Tachikawa et al. does not disclose a TE/TM converter.

Inoue et al. teaches a TE/TM converter (col. 16, lines 1-10).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the TE/TM converter of Inoue et al., since one would be motivated to make such a modification to achieve polarization-independent operation (col. 15, lines 54-67) as implied from Inoue et al. to thereby reduce birefringence and obtain a better signal.

13. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. in view of Wickham et al. and Amersfoort et al. (US Patent 5748811).

For purposes of being concise, Tachikawa et al. in view of Wickham et al. suggests a device as recited above. Tachikawa et al. further discloses gates, which would necessarily extract at identical timing (Fig. 9, #96), since the timing of the extraction process stays the same each time the gate is turned on.

However, Tachikawa et al. does not disclose a switch and second array.

Amersfoort et al. teaches a switch and second array (Fig. 14, #174, 176, and 178).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the suggested device of Tachikawa et al. as modified above with the switch and second array of Amersfoort et al., since one would be motivated to make such a modification to create networks where signals are switched among fibers without the necessity of converting the signal to electrical form (col. 1, lines 25-30) as implied from Amersfoort.

14. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. in view of Wickham et al. and Amersfoort et al. as applied to claim 11 above, and further in view of Ishida et al.

Tachikawa et al. as modified above suggests a device as recited above.

However, Tachikawa et al. does not disclose waveguides provided in forms of silica-based optical waveguides and a Mach-Zehnder switch having a thin film heater.

Wickham et al. further teaches waveguides provided in forms of silica-based optical waveguides (col. 4, lines 11-13). Ishida et al. teaches a Mach-Zehnder switch having a thin film heater (Fig. 22, #165).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the silica-based waveguides of Wickham et al., since one would be motivated to make such a modification to more easily place the components of the device on a compact surface substrate (Fig. 1, substrate under #12) as implied from Wickham et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with Mach-Zehnder switch of Ishida et al., since one would be motivated to make such a modification to make the device more compact (col. 1, line 56, "thin film") as implied from Ishida et al.

15. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. in view of Wickham et al. and Amersfoort et al. as applied to claim 11 above, and further in view of Kito et al.

Tachikawa et al. as modified above suggests a device as recited above.

However, Tachikawa et al. does not disclose a multi-mode interference optical coupler.

Kito et al. teaches a multi-mode interference optical coupler (Abstract, Solution).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the coupler of Kito et al., since one would be motivated to make such a modification for faster optical transmissions in optical communication systems (Abstract, Problem to be Solved) as implied from Kito et al.

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16. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tachikawa et al. in view of Wickham et al. and Amersfoort et al. as applied to claim 11 above, and further in view of Inoue et al.

Tachikawa et al. as modified above suggests a device as recited above.

However, Tachikawa et al. does not disclose a TE/TM converter.

Inoue et al. teaches a TE/TM converter (col. 16, lines 1-10).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the device of Tachikawa et al. as modified above with the TE/TM converter of Inoue et al., since one would be motivated to make such a modification to achieve polarization-independent operation (col. 15, lines 54-67) as implied from Inoue et al. to thereby reduce birefringence and obtain a better signal.

Response to Arguments

17. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent 6556322 discloses a device with at least a splitter (Fig. 1, #105), a delay array (Fig. 1, #131-134), a combiner (Fig. 1, #135), optical gates (Fig. 1, #111-114), and amplitude adjustments (Fig. 1, #127-130).

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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